YORK®
Heating and Air Conditioning

# *TECHNICAL GUIDE*

## AFFINITY

## MODELS: PM9*DH

## GAS-FIRED
## CONDENSING / HIGH EFFICIENCY
## DOWNFLOW / HORIZONTAL
## MODULATING FURNACES

**NATURAL GAS**
**60 - 120 MBH INPUT**

ISO 9001
Certified Quality
Management System

**Due to continuous product improvement, specifications are subject to change without notice.**

**Visit us on the web at www.york.com for the most up-to-date technical information.**

**Additional rating information can be found at www.gamanet.org.**

## DESCRIPTION

These Category IV, highly efficient, compact, condensing type furnaces are designed for residential and commercial installations in a basement, closet, alcove, recreation room or garage where the ambient temperature is above 32°F, or higher. They may be either side wall or thru-roof vented using approved plastic type combustion air and vent piping. All units are factory assembled, wired and tested to assure dependable and economical installation and operation.

## WARRANTY

*Lifetime limited warranty on both heat exchangers to the original purchaser; a 20-year limited warranty from original installation date to subsequent purchaser.*

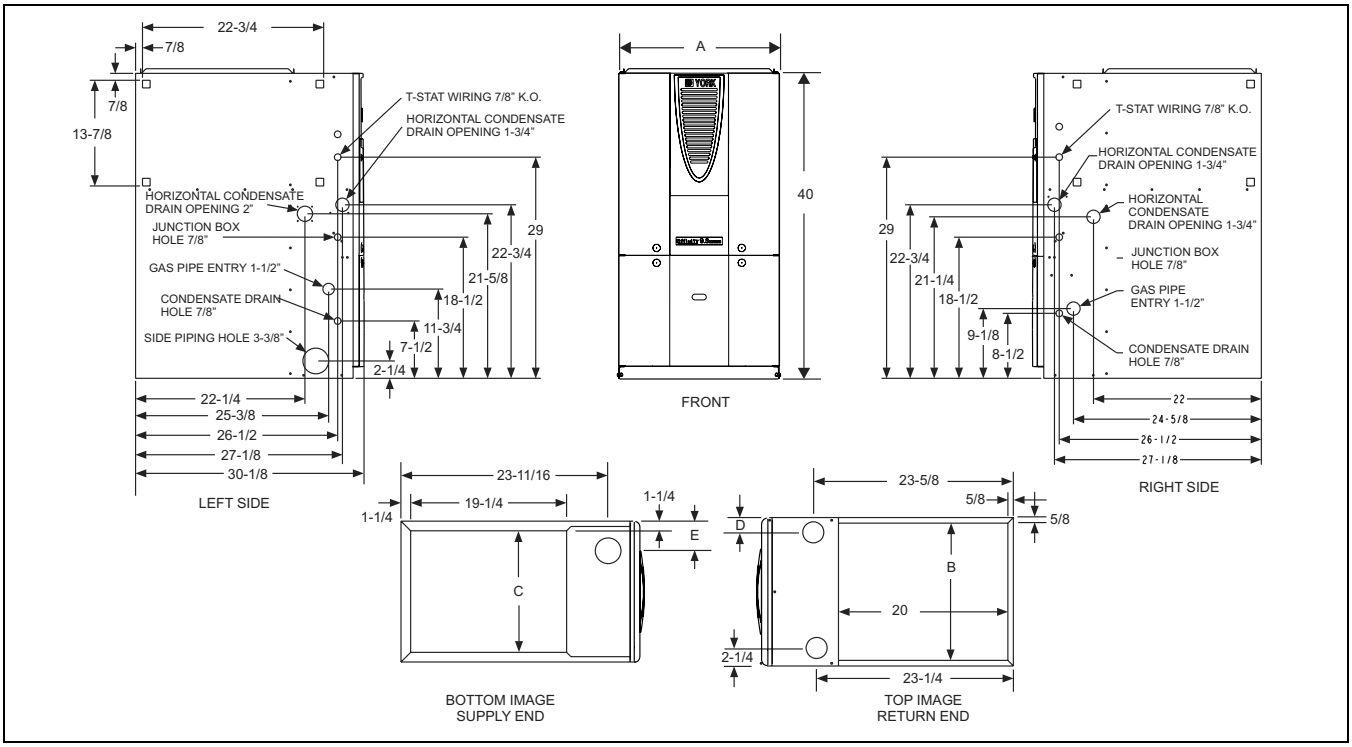
*10-year warranty on the heat exchanger in commercial applications.*

*5-year limited parts warranty.*

## FEATURES

- Modulating heating operation includes:
  - Modulating gas valve
  - Modulating inducer operation
- Provides increased comfort level & very quiet unit operation
- Compact, easy to install, ideal height 40" cabinet.
- Blower-off delay for cooling SEER improvement.
- Easy to connect power/control wiring.
- Built-in, high level self diagnostics with fault code display.
- Low unit amp requirement for easy replacement application.
- Integrated control module for reliable, economical operation.
- High velocity filter available for easy field installation.
- May be installed as either two-pipe (direct vent) or single pipe vent (using indoor combustion air)
- Top intake & vent connection allows installation in narrow locations.
- Electronic Hot Surface Ignition saves fuel cost with increased dependability and reliability.
- Induced combustion system with inshot main burners for quiet, efficient operation.
- No special vent termination kit required.
- 100% shut off main gas valve for extra safety.
- PSC - four speed, direct drive motor with large, quiet blower.
- 24V, 40 VA control transformer and blower relay supplied for add-on cooling.
- Hi-tech tubular aluminized steel primary heat exchanger.
- Secondary (condensing) heat exchanger of 29-4C high-grade stainless steel.
- Timed on, adjustable off blower capability for maximum comfort.
- Independent door removal for greater durabilty and ease of access.
- Easy access from front of unit for cleaning, maintenance or service.
- Protection from intake, exhaust or condensate blockage.
- Insulated blower compartment for quiet operation.
- 3-way transition facilitates fresh air piping.

FOR DISTRIBUTION USE ONLY - NOT TO BE USED AT POINT OF RETAIL SALE




## DIMENSIONS

| Models | CFM | Cabinet Size | Cabinet Dimension | | | | |
|---|---|---|---|---|---|---|---|
| | | | A (in.) | B (in.) | C (in.) | D (in.) | E (IN.) |
| PM9B12N060DH11 | 1200 | B | 17-1/2 | 16-1/4 | 15 | 1-3/4 | 2-3/8 |
| PM9B12N080DH11 | 1200 | B | 17-1/2 | 16-1/4 | 15 | 1-3/4 | 2-3/8 |
| PM9C16N080DH11 | 1600 | C | 21 | 19-3/4 | 18-1/2 | 2-1/8 | 2-3/4 |
| PM9C16N100DH11 | 1600 | C | 21 | 19-3/4 | 18-1/2 | 2-1/8 | 2-3/4 |
| PM9C20N100DH11 | 2000 | C | 21 | 19-3/4 | 18-1/2 | 2-1/8 | 2-3/4 |
| PM9D20N120DH11 | 2000 | D | 24-1/2 | 23-1/4 | 22 | 2-1/2 | 3 |

## ELECTRICAL AND PERFORMANCE DATA

| Models | Input Max/Min | Output Max/Min | Nominal Airflow | Cabinet Width | AFUE | Air Temp. Rise Maximum Input | Air Temp. Rise Minimum Input |
|---|---|---|---|---|---|---|---|
| | MBH | MBH | CFM | In. | % | °F | °F |
| PM9B12N060DH11 | 60 / 21 | 57 / 20 | 1200 | 17-1/2 | 95.0 | 40 - 70 | 20 - 50 |
| PM9B12N080DH11 | 80 / 28 | 76 / 26 | 1200 | 17-1/2 | 95.0 | 40 - 70 | 20 - 50 |
| PM9C16N080DH11 | 80 / 28 | 76 / 26 | 1600 | 21 | 95.0 | 40 - 70 | 20 - 50 |
| PM9C16N100DH11 | 100 / 35 | 95 / 33 | 1600 | 21 | 95.0 | 40 - 70 | 20 - 50 |
| PM9C20N100DH11 | 100 / 35 | 95 / 33 | 2000 | 21 | 95.0 | 40 - 70 | 20 - 50 |
| PM9D20N120DH11 | 120 / 42 | 115 / 39 | 2000 | 24-1/2 | 95.0 | 40 - 70 | 20 - 50 |

| Models | Max. Outlet Air Temp. | Blower | | Blower Size | Total Unit | Max. Over-current Protect | Min. Wire Size (awg) @ 75 ft. One Way | Approximate Operating Weight |
|---|---|---|---|---|---|---|---|---|
| | °F | HP | Amps | In. | Amps | | | |
| PM9B12N060DH11 | 170 | 1/2 | 7.0 | 11 x 8 | 9 | 20 | 14 | 136 |
| PM9B12N080DH11 | 170 | 1/2 | 7.0 | 11 x 8 | 9 | 20 | 14 | 143 |
| PM9C16N080DH11 | 170 | 3/4 | 10.2 | 11 x 10 | 12 | 20 | 14 | 159 |
| PM9C16N100DH11 | 170 | 3/4 | 10.2 | 11 x 10 | 12 | 20 | 14 | 163 |
| PM9C20N100DH11 | 170 | 1 | 12.7 | 11 x 11 | 14 | 20 | 12 | 165 |
| PM9D20N120DH11 | 170 | 1 | 12.7 | 11 x 11 | 14 | 20 | 12 | 182 |

Annual Fuel Utilization Efficiency (AFUE) numbers are determined in accordance with DOE Test procedures.
Wire size and over current protection must comply with the National Electrical Code (NFPA-70-latest edition) and all local codes.
The furnace shall be installed so that the electrical components are protected from water.

**BLOWER PERFORMANCE CFM - COOLING**

| COOLING AIRFLOW | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Models** | **Speed Tap** | **EXTERNAL STATIC PRESSURE, INCHES W.C. (kPa)** | | | | | | | | | |
| | | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 |
| | | CFM | CFM | CFM | CFM | CFM | CFM | CFM | CFM | CFM | CFM |
| PM9B12N060DH11<br>PM9B12N080DH11 | A | 1650 | 1605 | 1570 | 1525 | 1465 | 1410 | 1350 | 1275 | 1170 | 1060 |
| | B | 1165 | 1185 | 1175 | 1165 | 1150 | 1140 | 1100 | 1050 | 970 | 875 |
| | C | 895 | 915 | 935 | 940 | 940 | 920 | 905 | 860 | 815 | 750 |
| | D | 710 | 725 | 725 | 725 | 720 | 700 | 685 | 660 | 625 | 560 |
| PM9C16N080DH11<br>PM9C16N100DH11 | A | 1960 | 1955 | 1925 | 1890 | 1830 | 1765 | 1695 | 1615 | 1600 | 1485 |
| | B | 1565 | 1560 | 1560 | 1575 | 1545 | 1530 | 1475 | 1425 | 1365 | 1260 |
| | C | 1230 | 1275 | 1285 | 1300 | 1310 | 1300 | 1280 | 1245 | 1190 | 1070 |
| | D | 930 | 945 | 965 | 975 | 975 | 975 | 975 | 950 | 910 | 850 |
| PM9C20N100DH11 | A | 2300 | 2210 | 2120 | 2020 | 1930 | 1830 | 1715 | 1595 | 1480 | 1350 |
| | B | 1950 | 1900 | 1830 | 1755 | 1680 | 1595 | 1500 | 1390 | 1270 | 1155 |
| | C | 1610 | 1545 | 1490 | 1440 | 1390 | 1315 | 1230 | 1155 | 1050 | 920 |
| | D | 1325 | 1270 | 1225 | 1175 | 1105 | 1045 | 990 | 905 | 890 | 790 |
| PM9D20N120DH11 | A | 2560 | 2485 | 2410 | 2320 | 2220 | 2135 | 2035 | 1920 | 1785 | 1650 |
| | B | 2090 | 2050 | 1990 | 1970 | 1885 | 1820 | 1760 | 1675 | 1545 | 1405 |
| | C | 1695 | 1675 | 1665 | 1615 | 1565 | 1510 | 1460 | 1385 | 1285 | 1140 |
| | D | 1175 | 1150 | 1135 | 1110 | 1085 | 1055 | 1005 | 980 | 970 | 845 |

**⚠ CAUTION**

**Blower speed adjustments should be done by moving the COOL jumper on the control board. DO NOT move the motor wires to different positions on the furnace control board.**

NOTES:

1. Airflow expressed in standard cubic feet per minute (CFM) and in cubic meters per minute.
2. Motor voltage at 115 V.

## FILTER PERFORMANCE

The airflow capacity data published in the “Blower Performance” table listed above represents blower performance WITHOUT filters. To determine the approximate blower performance of the system, apply the filter drop value for the filter being used or select an appropriate value from the “Filter Performance” table shown.

**NOTE:** The filter pressure drop values in the “Filter Performance” table shown are typical values for the type of filter listed and should only be used as a guideline. Actual pressure drop ratings for each filter type vary between filter manufacturer.

### FILTER SIZES

| CFM | Cabinet Size | Top Return Filter in |
|---|---|---|
| 1200 | B | (2) 14 x 20 |
| 1600 | C | (2) 14 x 20 |
| 2000 | C | (2) 14 x 20 |
| 2000 | D | (2) 14 x 20 |

NOTE: All filters must be high velocity cleanable type.

### FILTER PERFORMANCE - PRESSURE DROP INCHES W.C.

| Airflow Range | Minimum Opening Size | Filter Type | | |
|---|---|---|---|---|
| | | Disposable | Washable Fibers* | Pleated |
| CFM | $in^2$ | In W.C. | In W.C. | In W.C. |
| 0 - 750 | 230 | 0.01 | 0.01 | 0.15 |
| 751 - 1000 | 330 | 0.05 | 0.05 | 0.20 |
| 1001 - 1250 | 330 | 0.10 | 0.10 | 0.20 |
| 1251 - 1500 | 330 | 0.10 | 0.10 | 0.25 |
| 1501 - 1750 | 380 | 0.15 | 0.14 | 0.30 |
| 1751 - 2000 | 380 | 0.19 | 0.18 | 0.30 |
| 2001 & Above | 463 | 0.19 | 0.18 | 0.30 |

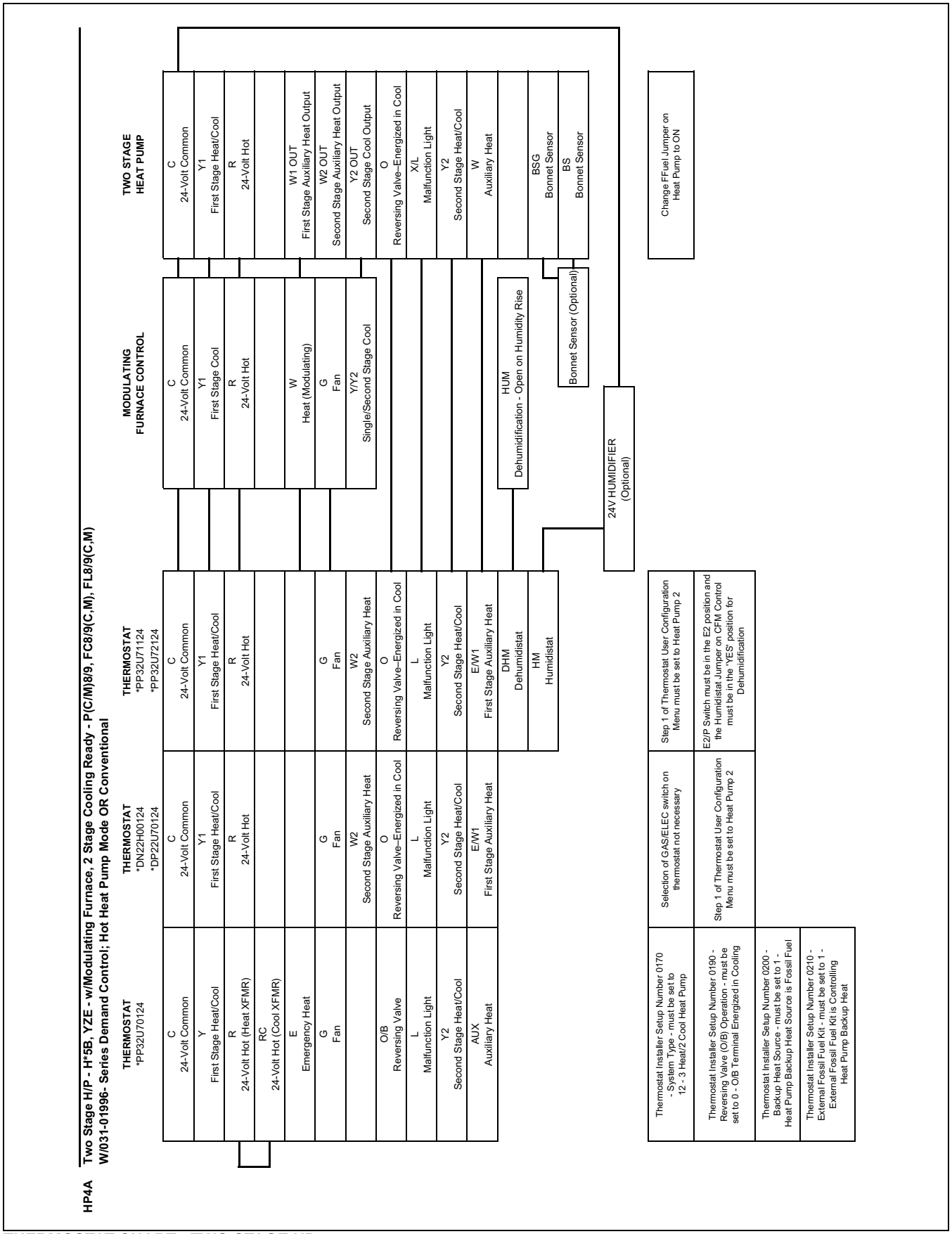
* Washable Fibers Filters are the type supplied with furnace (if supplied).

### UNIT CLEARANCES TO COMBUSTIBLES

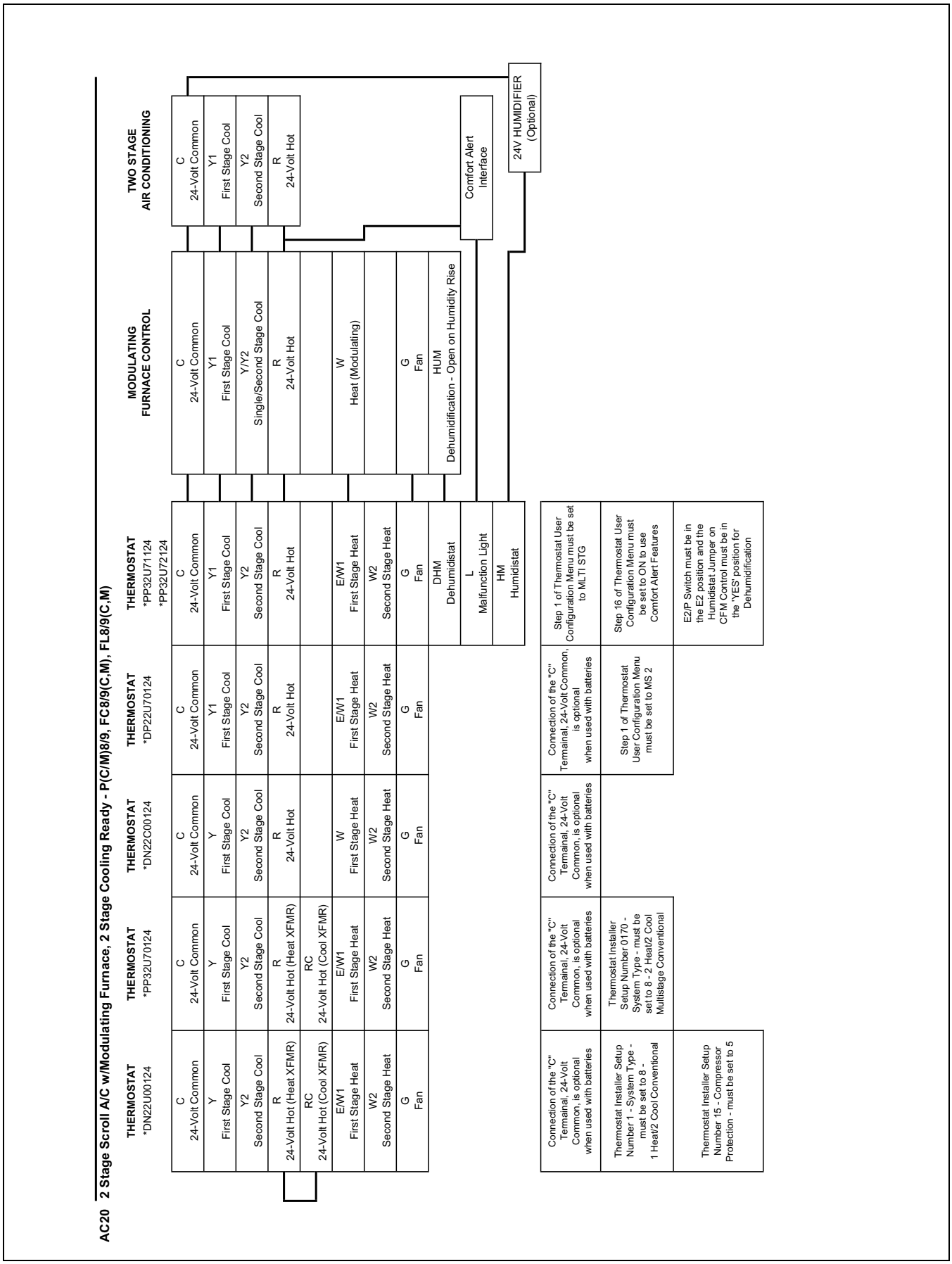
| Application | Top | Front | Rear | Left Side | Right Side | Flue | Floor/Bottom | Closet | Alcove | Attic | Line Contact |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | In. | In. | In. | In. | In. | In. | In. | | | | |
| DOWNFLOW | 1 | 3 | 0 | 0 | 0 | 0 | 1* | Yes | Yes | Yes | NA |
| HORIZONTAL | 0 | 3 | 0 | 1 | 1 | 0 | 0† | Yes | Yes | Yes | Yes† |

* Combustible floor base or air conditioning coil required for use on combustible floor.
† Line contact only permitted between lines formed by the intersection of the rear panel (top in horizontal position) of the furnace jacket and building joists, studs or framing.

For additional connection diagrams for all UPG equipment refer to “Line Voltage System Wiring” document available online at www.upgnet.com in the Product Catalog Section.




**THERMOSTAT CHART - TWO STAGE HP**


AC20 2 Stage Scroll A/C w/Modulating Furnace, 2 Stage Cooling Ready - P(C/M)8/9, FC8/9(C,M), FL8/9(C,M)
THERMOSTAT *DN22U00124
C 24-Volt Common
Y First Stage Cool
Y2 Second Stage Cool
R 24-Volt Hot (Heat XFMR)
RC 24-Volt Hot (Cool XFMR)
E/W1 First Stage Heat
W2 Second Stage Heat
G Fan
Connection of the "C" Termainal, 24-Volt Common, is optional when used with batteries
Thermostat Installer Setup Number 1 - System Type - must be set to 8 - 1 Heat/2 Cool Conventional
Thermostat Installer Setup Number 15 - Compressor Protection - must be set to 5
THERMOSTAT *PP32U70124
C 24-Volt Common
Y First Stage Cool
Y2 Second Stage Cool
R 24-Volt Hot (Heat XFMR)
RC 24-Volt Hot (Cool XFMR)
E/W1 First Stage Heat
W2 Second Stage Heat
G Fan
Connection of the "C" Termainal, 24-Volt Common, is optional when used with batteries
Thermostat Installer Setup Number 0170 - System Type - must be set to 8 - 2 Heat/2 Cool Multistage Conventional
THERMOSTAT *DN22C00124
C 24-Volt Common
Y First Stage Cool
Y2 Second Stage Cool
R 24-Volt Hot
W First Stage Heat
W2 Second Stage Heat
G Fan
Connection of the "C" Termainal, 24-Volt Common, is optional when used with batteries
THERMOSTAT *DP22U70124
C 24-Volt Common
Y1 First Stage Cool
Y2 Second Stage Cool
R 24-Volt Hot
E/W1 First Stage Heat
W2 Second Stage Heat
G Fan
Connection of the "C" Termainal, 24-Volt Common, is optional when used with batteries
Step 1 of Thermostat User Configuration Menu must be set to MS 2
THERMOSTAT *PP32U71124 *PP32U72124
C 24-Volt Common
Y1 First Stage Cool
Y2 Second Stage Cool
R 24-Volt Hot
E/W1 First Stage Heat
W2 Second Stage Heat
G Fan
DHM Dehumidistat
L Malfunction Light
HM Humidistat
Connection of the "C" Termainal, 24-Volt Common, is optional when used with batteries
Step 1 of Thermostat User Configuration Menu must be set to MLTI STG
Step 16 of Thermostat User Configuration Menu must be set to ON to use Comfort Alert Features
E2/P Switch must be in the E2 position and the Humidistat Jumper on CFM Control must be in the 'YES' position for Dehumidification
MODULATING FURNACE CONTROL
C 24-Volt Common
Y1 First Stage Cool
Y/Y2 Single/Second Stage Cool
R 24-Volt Hot
W Heat (Modulating)
G Fan
HUM Dehumidification - Open on Humidity Rise
Comfort Alert Interface
24V HUMIDIFIER (Optional)
TWO STAGE AIR CONDITIONING
C 24-Volt Common
Y1 First Stage Cool
Y2 Second Stage Cool
R 24-Volt Hot

**THERMOSTAT CHART - TWO STAGE AC**

## APPLYING FILTER PRESSURE DROP TO DETERMINE SYSTEM AIRFLOW

To determine the approximate airflow of the unit with a filter in place, follow the steps below:

1. Select the filter type.
2. Determine the External System Static Pressure (ESP) without the filter.
3. Select a filter pressure drop from the table based upon the number of return air openings or return air opening size and add to the ESP from Step 3 to determine the total system static.
4. If total system static matches a ESP value in the airflow table (i.e. 0.20, 0.60, etc,) the system airflow corresponds to the intersection of the ESP column and Model/ Blower Speed row.
5. If the total system static falls between ESP values in the table (i.e. 0.58, 0.75, etc.), the static pressure may be rounded to the nearest value in the table determining the airflow using Step 5 or calculate the airflow by using the following example.

**Example:** For a 120,000 Btuh furnace operating on high speed blower, it is found that total system static is 0.58" w.c. To determine the system airflow, complete the following steps:

1. Obtain the airflow values at 0.50" & 0.60" ESP.

   Airflow @ 0.50": 2220CFM

   Airflow @ 0.60": 2135 CFM
2. Subtract the airflow @ 0.50" from the airflow @ 0.60" to obtain airflow difference.

   2135 - 2220 = -85 CFM

   Subtract the total system static from 0.50" and divide this difference by the difference in ESP values in the table, 0.60" - 0.50", to obtain a percentage.

   (0.58 - 0.50) / (0.60 - 0.50) = 0.8
3. Multiply percentage by airflow difference to obtain airflow reduction.

   (0.8) x (-85) = -68
4. Subtract airflow reduction value to airflow @ 0.50" to obtain actual airflow @ 0.58" ESP.

   2120 - 68 = 2152

## ACCESSORIES

**PROPANE (LP) CONVERSION KIT -**

1NP0680 - All units

This accessory conversion kit may be used to convert natural gas (N) units for propane (LP) operation. Conversions must be made by qualified distributor or dealer personnel.

**CONCENTRIC VENT TERMINATION -**

1CT0302 (2")

1CT0303 (3")

**CONDENSATE NEUTRALIZER KIT -** 1HT0901

Neutralizer cartidge has a 1/2" plastic tube fittings for installation in the drain line. Calcium carbonate refill media is also avaiable from the Source 1 Parts (p/n 026-30228-000).

**SIDEWALL VENT TERMINATION -**

1HT0901 (2")

For use through rooftop, sidewall. Allows combustion air to enter and exhaust to exit through single common hole. Eliminates unslightly elbows for a cleaner installation.

**COMBUSTIBLE FLOOR BASE -**

1CB0317 - 17 1/2” Cabinet
1CB0321 - 21” Cabinet
1CB0324 - 24-1/2” Cabinet

**COIL TRANSITION -**

1TK0917 - 17 1/2” Cabinet
1TK0921 - 21” Cabinet
1TK0924 - 24-1/2” Cabinet
Required in downflow applications when using G*FD series coils.

**ROOM THERMOSTATS** - A wide selection of compatible thermosets are available to provide optimum performance and features for any installation.

1H/1C, manual change-over electronic non-programmable thermostat.

1H/1C, auto/manual changeover, electronic programmable, deluxe 7-day, thermostat.

1H/1C, auto/manual changeover, electronic programmable.

* For the most current accessory information, refer to the

# NOTES

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